

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An endoscope image pick-up apparatus ~~for picking up an image of the body by an image pick-up unit inserted in the body and for transmitting the image by radio to an extra-corporeal unit which is arranged outside the body, wherein the image pick-up unit comprises~~ comprising:

an image pick-up unit for insertion into the body ~~device~~ for capturing an image;

an extra-corporeal unit arranged outside the body, the extra-corporeal unit receiving the image captured by the image pick-up unit by radio;

a data transmitting device provided in the image pick-up unit for transmitting the image obtained by the image pick-up device to the extra-corporeal unit at a plurality of transmitting ratios;

a characteristic amount detecting device provided in the image pick-up unit for detecting a first amount of characteristics and predetermined a second amount of characteristics different from the first amount of characteristics from the image obtained by the image pick-up unit, the first amount of characteristics detected by the characteristic amount detecting device being a number of pixels having a specific color ~~based on the image;~~ and

a determining device provided in the image pick-up unit for determining a validity of the
valid image based on an output from according to the characteristic amount detected by the
characteristic amount detecting device, the determining device having a first determining device
for determining the validity of the image based on the number of pixels having a specific color
detected as the first amount of characteristics, and a second determining device for determining
the validity of the image based on the second amount of characteristics which is different from
the first amount of characteristics, the data transmitting device controls the data transmitting ratio
in accordance with the determining result of the determining device.

2. (Withdrawn) An endoscope image pick-up apparatus according to Claim 1, wherein the
determining device comprises:

an invalidity determining device for determining whether the image is invalid or valid;
and

a target image determining device for determining whether or not the image is a target image, and
the image validity is determined at a plurality of stages based on the combination of the
determining results, and the determining result is outputted.

3. (Canceled)

4. (Withdrawn) An endoscope image pick-up apparatus for picking up an image of the body by
an image pick-up unit and for transmitting the image by radio to an extra-corporeal unit, wherein
the image pick-up unit comprises:

an image pick-up device for capturing the image;

a compressing device for compressing the image obtained by the image pick-up device;

a data transmitting device for transmitting the data compressed by the compressing device to the extra-corporeal unit at a plurality of transmitting ratios; and

a determining device for determining the validity of the image by comparing the data size compressed by the compressing device with a predetermined threshold value, and the data transmitting device controls the data transmitting ratio in accordance with the determining result outputted by the determining device.

5. (Withdrawn) An endoscope image pick-up apparatus according to Claim 1, wherein the determining device comprises:

an invalidity determining device for determining whether the image is invalid or valid;

and

a target image determining device for determining whether or not the image is a target image, and the validity of the image is determined at a plurality of stages based on the combination of the determining results and the determining result is outputted.

6. (Canceled)

7. (Original) An endoscope image pick-up apparatus according to Claim 1, wherein the characteristic amount detecting device comprises:

a pixel number detecting device for detecting the number of pixels having a specific color in the image;

a pixel number storing device for storing the detected number of pixels; and

a pixel number comparing and calculating device for comparing and calculating the past number of pixels stored in the pixel number storing device and the current number of pixels and for outputting the change amount of the number of pixels as the characteristic amount, and the determining device determines that the image is valid when the change amount of number of pixels is a predetermined threshold value or more.

8. (Withdrawn) An endoscope image pick-up apparatus according to Claim 1, wherein the characteristic amount detecting device comprises:

a color distribution detecting device for detecting the characteristic of a color distribution in the image; and

a color distribution comparing and calculating device for comparing and calculating the detected color distribution and a predetermined color distribution and for outputting an error of the color distribution as the characteristic amount, and the determining device determines that the image is valid when the error of the color distribution is a predetermined threshold value or less.

9. (Withdrawn) An endoscope image pick-up apparatus according to Claim 1, wherein the characteristic amount detecting device comprises a luminance average value calculating device for detecting an average value of luminance values in the image as the characteristic amount, and the determining device determines that the image is valid when the average value of luminance is within a predetermined range.

10. (Withdrawn) An endoscope image pick-up apparatus according to Claim 1, wherein the characteristic amount detecting device comprises:

- a luminance average value calculating device for detecting an average value of luminance values in the image;

- a luminance average value storing device for storing the luminance average value; and

- a luminance average value comparing and calculating device for comparing and calculating the past luminance average value stored in the luminance average value storing device and the current luminance average value and for outputting the change amount of the luminance average value as the characteristic amount, and the determining device determines that the image is valid when the change amount of luminance average value is a predetermined threshold value or more.

11. (Withdrawn) An endoscope image pick-up apparatus according to Claim 1, wherein the characteristic amount detecting device comprises:

- an image storing device for storing the picked-up image; and

- an image data difference calculating device for calculating the difference between the past image data stored in the image storing device and the current image data and for outputting the calculated difference as the characteristic amount, and the determining device determines that the image is valid when the difference is a predetermined value or more.

12. (Original) An endoscope image pick-up apparatus according to Claim 1, wherein the image pick-up unit comprises a command receiving device for receiving a plurality of types of commands from the extra-corporeal unit, and the data transmitting device controls a data transmitting ratio based on the command received by the command receiving device, and invalidates the control of the data transmitting ratio by the determining device based on another command received by the command receiving device.

13. (Currently Amended) An endoscope image pick-up apparatus ~~for picking up an image of the body by an image pick-up unit and for transmitting the image by radio to an extra-corporeal unit, wherein the image pick-up unit comprises~~ comprising:

an image pick-up unit for insertion into the body device for capturing an the image;

an extra-corporeal unit arranged outside the body, the extra-corporeal unit receiving the image captured by the image pick-up unit by radio;

a determining device provided in the image pick-up unit for determining a validity of the image according to the characteristic amount detected by the characteristic amount detecting device, the determining device having a first determining device for determining the validity of the image based on the number of pixels having a specific color detected as the first amount of characteristics, and a second determining device for determining the validity of the image based on the second amount of characteristics which is different from the first amount of characteristics; and

a data processing device provided in the image pick-up unit for performing the processing for reducing the data amount of the image obtained by the image pick-up device at a plurality of ratios, the data processing device controlling a reducing ratio of data amount in accordance with the determining result outputted by the determining device;

~~a data transmitting device for transmitting the data processed by the data processing device to the extra-corporeal unit;~~

~~a characteristic amount detecting device for detecting a predetermined amount of characteristics based on the image; and~~

~~a determining device for determining based on the amount of characteristics whether or not the image is valid, and~~

~~the data processing device controls a reducing ratio of data amount in accordance with the determining result outputted by the determining device.~~

14. (Withdrawn) An endoscope image pick-up apparatus according to Claim 13, wherein the determining device comprises:

an invalidity determining device for determining whether the image is valid or invalid;
and
a target image determining device for determining whether or not the image is a target image, and
it is determined based on the combination of the determining results at a plurality of stages that
the image is valid and the determining result is outputted.

15. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the characteristic amount detecting device comprises a pixel number detecting device for detecting the number of pixels having a specific color in the image as the characteristic amount, and the determining device determines that the image is valid when the number of specific-color pixels is a predetermined threshold value or more.

16. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the characteristic amount detecting device comprises:

a pixel number detecting device for detecting the number of pixels having a specific color in the image;

a pixel number storing device for storing the detected number of pixels; and

a pixel number comparing and calculating device for comparing and calculating the past number of pixels stored in the pixel number storing device and the current number of pixels and for outputting the change amount of number of pixels as the characteristic amount, and the determining device determines that the image is valid when the change amount of the number of pixels is a predetermined threshold value or more.

17. (Withdrawn) An endoscope image pick-up apparatus according to Claim 13, wherein the characteristic amount detecting device comprises:

a color distribution detecting device for detecting the characteristic of a color distribution in the image; and

a color distribution comparing and calculating device for comparing and calculating the detected color distribution and a predetermined color distribution and for outputting an error of the color distribution as the characteristic amount, and the determining device determines that the image is valid when the error of the color distribution is a predetermined threshold value or less.

18. (Withdrawn) An endoscope image pick-up apparatus according to Claim 13, wherein the characteristic amount detecting device comprises a luminance average value calculating device for detecting an average value of luminance values in the image as the characteristic amount, and the determining device determines that the image is valid when the average value of luminance is within a predetermined range.

19. (Withdrawn) An endoscope image pick-up apparatus according to Claim 13, wherein the characteristic amount detecting device comprises:

a luminance average value calculating device for detecting an average value of luminance values in the image;

a luminance average value storing device for storing the luminance average value; and

a luminance average value comparing and calculating device for comparing and calculating the past luminance average value stored in the luminance average value storing device and the current luminance average value and for outputting the change amount of the luminance average value as the characteristic amount, and

the determining device determines that the image is valid when the change amount of the luminance average value is a predetermined threshold value or more.

20. (Withdrawn) An endoscope image pick-up apparatus according to Claim 13, wherein the characteristic amount detecting device comprises:

an image storing device for storing the picked-up image; and

an image data difference calculating device for calculating the difference between the past image data stored in the image storing device and the current image data and for outputting the calculated difference as the characteristic amount, and

the determining device determines that the image is valid when the difference is a predetermined value or more.

21. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the data processing device comprises an image reducing device for reducing image data at a plurality of reducing ratios.

22. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the data processing device comprises a bit-length adjusting device for switching the bit length of the image data to a plurality of lengths.

23. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the data processing device comprises an image cut-out device for cutting out a part of the image data and for outputting the cut-out image.

24. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the data processing device comprises a compressing device for compressing the image data at a plurality of compressing ratios.

25. (Original) An endoscope image pick-up apparatus according to Claim 13, wherein the image pick-up unit comprises a command receiving device for receiving a plurality of types of commands from the extra-corporeal unit, and

the data processing device controls a reducing ratio of data amount based on the command received by the command receiving device, and invalidates the control of the reducing ratio of data amount by the determining device based on another command received by the command receiving device.

26. (Withdrawn) An endoscope image pick-up apparatus for picking up an image of the body by an image pick-up unit and for transmitting the image by radio to an extra-corporeal unit, wherein the image pick-up unit comprises:

an image pick-up device for capturing the image;

a compressing device for compressing the image obtained by the image pick-up device;

a data transmitting device for transmitting the data compressed by the compressing device to the extra-corporeal unit at a plurality of transmitting ratios; and

a determining device for determining the validity of the image by comparing the data size compressed by the compressing device with a predetermined threshold value, and

the data transmitting device controls the data transmitting ratio in accordance with the determining result outputted by the determining device.

27. (Withdrawn) An endoscope image pick-up apparatus according to Claim 26, wherein the image pick-up unit comprises a command receiving device for receiving a plurality of types of commands from the extra-corporeal unit, and

the data transmitting device controls a data transmitting ratio based on the command received by the command receiving device, and invalidates the control of the data transmitting ratio by the determining device based on another command received by the command receiving device.

28. (Withdrawn) An endoscope image pick-up apparatus for picking up an image of the body by an image pick-up unit and for transmitting the image by radio to an extra-corporeal unit, wherein the image pick-up unit comprises:

an image pick-up device for capturing the image;

a compressing device for compressing the image obtained by the image pick-up device;

a data transmitting device for transmitting the data compressed by the compressing device to the extra-corporeal unit at a plurality of transmitting ratios;

a compressed data size storing device for storing the data size compressed by the compressing device;

a compressed data size difference calculating device for calculating the difference between the past compressed data size stored in the compressed data size storing device and the current compressed data size; and

a determining device for comparing the difference in the compressed data size with a predetermined threshold value and for determining whether or not the image is valid, and the data transmitting device controls a data transmitting ratio in accordance with the determining result outputted by the determining device.

29. (Withdrawn) An endoscope image pick-up apparatus according to Claim 28, wherein the image pick-up unit comprises a command receiving device for receiving a plurality of types of commands from the extra-corporeal unit, and the data transmitting device controls a data transmitting ratio based on the command received by the command receiving device, and invalidates the control of the data transmitting ratio by the determining device based on another command received by the command receiving device.

30. (Withdrawn) An endoscope image pick-up apparatus for picking up an image of the body by an image pick-up unit and for transmitting the image by radio to an extra-corporeal unit, wherein the image pick-up unit comprises:

an image pick-up device for capturing the image;

a storing device for storing the image obtained by the image pick-up device; and

a processing device for reading the image from the storing device and for performing predetermined processing, and upon storing the image, the storing device operates at the high-speed clock similar to that of the image pick-up device and, upon processing the image, the storing device operates at the low-speed clock similar to that of the processing device.

31. (New) An endoscope image pick-up apparatus according to Claim 1, wherein the first determining device compares the characteristic amount detected by the characteristic amount detecting device with a first threshold value to determine whether the image is valid or invalid, and outputs an invalid-indicating signal if the image is determined as the invalid one, and the data transmitting device responds to the invalid-indicating signal outputted from the first determining device to stop transmitting the corresponding image.

32. (New) An endoscope image pick-up apparatus according to Claim 1, wherein the first determining device compares the characteristic amount detected by the characteristic amount detecting device with a first threshold value to determine whether the image is valid or invalid, and outputs an invalid-indicating signal if the image is determined as the invalid one, and the data transmitting device responds to the invalid-indicating signal outputted from the first determining device to lower the transmitting ratio of the corresponding image.

33. (New) An endoscope image pick-up apparatus according to Claim 1, wherein the second determining device compares the characteristic amount detected by the characteristic amount detecting device with a second threshold value to determine whether the image is a target image or not, and outputs a target-indicating signal if the image is determined as the target one, and the data transmitting device responds to the target-indicating signal outputted from the second determining device to raise the transmitting ratio of the corresponding image.

34. (New) An endoscope image pick-up apparatus according to Claim 1, wherein the first determining device compares the characteristic amount detected by the characteristic amount detecting device with a first threshold value to determine whether the image is valid or invalid, and outputs an invalid-indicating signal if the image is determined as the invalid one, the second determining device compares the characteristic amount detected by the characteristic amount detecting device with a second threshold value to determine whether the image is a target image or not, and outputs a target-indicating signal if the image is determined as the target one, and the data transmitting device responds to the invalid-indicating signal outputted from the first determining device to stop transmitting the corresponding image, and responds to the target-indicating signal outputted from the second determining device to raise the transmitting ratio of the corresponding image.

35. (New) An endoscope image pick-up apparatus according to Claim 1, wherein the second amount of characteristics is an average value of luminance values in the image.